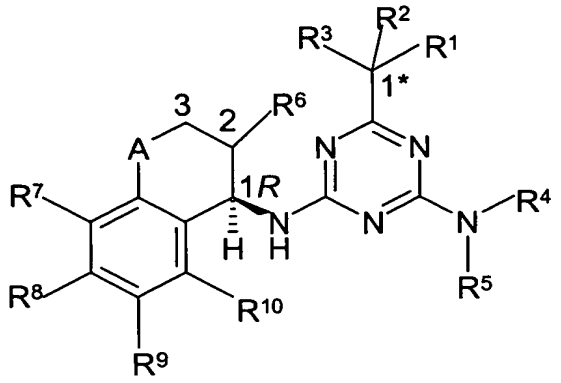
CLAIMS BCS 03-1002 TW / US

1. An optically active compound of formula (I),



(I)

in which:

R^1 is H, halogen, $(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_6)$haloalkyl, $[(C_1\text{-}C_4)$alkoxy$](C_1\text{-}C_6)$alkyl, $(C_3\text{-}C_6)$cycloalkyl which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, $(C_1\text{-}C_4)$alkyl and $(C_1\text{-}C_4)$haloalkyl, or is $(C_2\text{-}C_6)$alkenyl, $(C_2\text{-}C_6)$alkynyl, $(C_2\text{-}C_6)$haloalkenyl, $(C_4\text{-}C_6)$cycloalkenyl, $(C_4\text{-}C_6)$halocycloalkenyl, $(C_1\text{-}C_6)$alkoxy or $(C_1\text{-}C_6)$haloalkoxy;

R^2 is H, halogen, $(C_1\text{-}C_6)$alkyl or $(C_1\text{-}C_4)$alkoxy; or

R^1 and R^2 can together with the attached carbon atom form a $(C_3\text{-}C_6)$cycloalkyl or $(C_4\text{-}C_6)$cycloalkenyl ring;

R^3 is H, $(C_1\text{-}C_6)$alkyl, $(C_1\text{-}C_4)$alkoxy or halogen;

R^4 and R^5 are each independently H, $(C_1\text{-}C_4)$alkyl, $(C_1\text{-}C_4)$haloalkyl, $(C_3\text{-}C_4)$alkenyl, $(C_3\text{-}C_4)$haloalkenyl, $(C_3\text{-}C_4)$alkynyl, $(C_3\text{-}C_4)$haloalkynyl or an acyl radical;

R^6 is H, $(C_1\text{-}C_6)$alkyl or $(C_1\text{-}C_6)$alkoxy;

R^7, R^8, R^9 and R^{10} are each independently H, $(C_1\text{-}C_4)$alkyl, $(C_1\text{-}C_3)$haloalkyl, halogen, $(C_1\text{-}C_3)$alkoxy, $(C_1\text{-}C_3)$haloalkoxy or CN;

A is CH_2, O or a direct bond;

and the stereochemical configuration at the marked 1 position is (*R*) having a stereochemical purity of from 60 to 100 % (*R*),

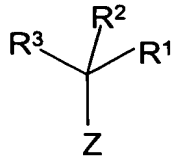
or an agriculturally acceptable salt thereof.

2. A compound or a salt thereof as claimed in claim 1, wherein:
R^1 is H, halogen, $(C_1$-$C_4)$alkyl, such as methyl, ethyl, n-propyl or iso-propyl, or is $(C_1$-$C_4)$haloalkyl, $[(C_1$-$C_4)$alkoxy$](C_1$-$C_4)$alkyl, $(C_3$-$C_6)$cycloalkyl which is unsubstituted or substituted by one or two $(C_1$-$C_4)$alkyl groups, or is $(C_3$-$C_4)$halocycloalkyl, $(C_2$-$C_4)$alkenyl, $(C_2$-$C_4)$haloalkenyl, $(C_2$-$C_4)$alkynyl, $(C_1$-$C_4)$alkoxy or $(C_1$-$C_4)$haloalkoxy;
R^2 is H or $(C_1$-$C_4)$alkyl; or
R^1 and R^2 together with the attached carbon atom form a $(C_3$-$C_6)$cycloalkyl ring;
R^3 is H, $(C_1$-$C_4)$alkyl, $(C_1$-$C_2)$alkoxy or halogen;
R^4 is H, $(C_1$-$C_4)$alkyl, $(C_1$-$C_4)$haloalkyl, $(C_3$-$C_4)$alkenyl, $(C_3$-$C_4)$alkynyl or an acyl radical having 1 to 12 carbon atoms;
R^5 is H, $(C_1$-$C_4)$alkyl or $(C_1$-$C_4)$haloalkyl;
R^6 is H, $(C_1$-$C_3)$alkyl or $(C_1$-$C_3)$alkoxy;
R^7, R^8, R^9 and R^{10} are each independently H, $(C_1$-$C_3)$alkyl, halogen or $(C_1$-$C_3)$alkoxy; and
A is CH_2, O or a direct bond.

3. A compound or a salt thereof as claimed in claim 1, wherein:
R^1 is H or $(C_1$-$C_3)$alkyl;
R^2 is H or $(C_1$-$C_3)$alkyl; or
R^1 and R^2 together with the attached carbon atom form a $(C_3$-$C_4)$cycloalkyl ring;
R^3 is H, $(C_1$-$C_2)$alkyl, methoxy, Cl or F;
R^4 is H, $(C_1$-$C_3)$alkyl, $(C_1$-$C_3)$haloalkyl, allyl, propargyl, CHO, $-CO(C_1$-$C_3)$alkyl or $-CO(C_1$-$C_3)$haloalkyl;
R^5 is H or $(C_1$-$C_2)$alkyl;
R^6 is H, $(C_1$-$C_3)$alkyl or $(C_1$-$C_3)$alkoxy;
R^7, R^8, R^9 and R^{10} are each independently H, methyl, F and Cl; and
A is CH_2, O or a direct bond.

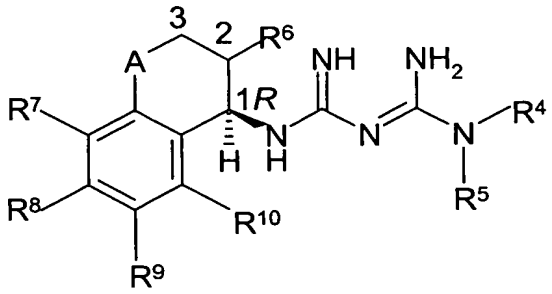
4. A process for the preparation of a compound of the formula (I) or a salt thereof as defined in claim 1, which process comprises:

a) reacting a compound of formula (II):



(II)

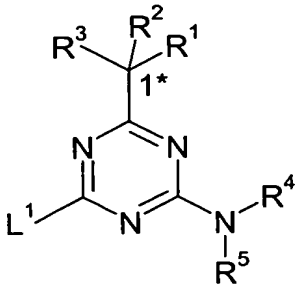
wherein R^1, R^2 and R^3 are as defined in formula (I), and Z is a functional group selected from the group consisting of carboxylic ester, carboxylic orthoester, carboxylic acid chloride, carboxamide, cyano, carboxylic anhydride or trichloromethyl, with a biguanidine compound of formula (III) or an acid addition salt thereof:



(III)

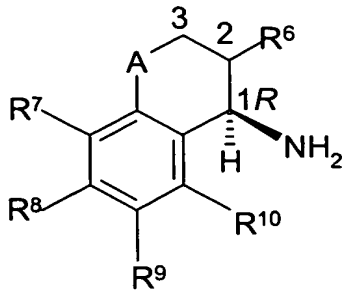
wherein R^4, R^5, R^6, R^7, R^8, R^9, R^{10} and A and the configuration at the marked 1 position are as defined in formula (I);

b) reacting a compound of formula (IV):



(IV)

wherein R^1, R^2, R^3, R^4 and R^5 and the configuration at the marked 1* position are as defined in formula (I), and L^1 is a leaving group, with an amine of formula (V) or an acid addition salt thereof:



(V)

wherein R^6, R^7, R^8, R^9, R^{10} and A and the configuration at the marked 1 position are as defined in formula (I);

c) where one of R^4 or R^5 in formula (I) is $(C_1$-$C_4)$alkyl, $(C_1$-$C_4)$haloalkyl, $(C_3$-$C_4)$alkenyl, $(C_3$-$C_4)$haloalkenyl, $(C_3$-$C_4)$alkynyl or $(C_3$-$C_4)$haloalkynyl, reacting the corresponding compound of formula (I) wherein said R^4 or R^5 respectively is H, and the other radicals and the configurations are as defined in formula (I), with an alkylating agent of formula (VI) or (VII) respectively:

R^4-L^2 (VI) R^5-L^2 (VII)

wherein L^2 is a leaving group;

d) where one of R^4 or R^5 is an acyl radical in formula (I), reacting the corresponding compound of formula (I) wherein said R^4 or R^5 respectively is H, and the other radicals and the configurations are as defined in formula (I), with an acylating agent of formula (VIII) or (IX) respectively:

R^4-L^3 (VIII) R^5-L^3 (IX)

wherein R^4 and R^5 are each an acyl radical as defined in formula (I) and L^3 is a leaving group; or

e) resolving a compound of formula (I) by using in the above-described processes one or more intermediates (II), (III), (IV) or (V) whose configuration differs from the configuration as defined in the compound of formula (I) to be prepared, and resolving the mixture obtained according to known methods of resolution.

5. A herbicidal or plant growth regulating composition, which comprises one or more compounds of the formula (I) or their salts as claimed in claim 1 and formulation auxiliaries applicable in crop protection.

6. A method of controlling harmful plants or for regulating the growth of plants, which comprises applying an active amount of one or more compounds of the formula (I) or their salts as claimed in claim 1 to the plants, plant seeds or the area under cultivation.

7. The use of compounds of the formula (I) or their salts as claimed in claim 1 as herbicides or plant growth regulators.

8. A compound of the formula (V), or salts thereof, as defined in claim 4, wherein R^4 and R^5 are hydrogen, and R^6 is H, $(C_1$-$C_6)$alkyl or $(C_1$-$C_6)$alkoxy;
R^7, R^8, R^9 and R^{10} are each independently H, $(C_1$-$C_4)$alkyl, $(C_1$-$C_3)$haloalkyl, halogen, $(C_1$-$C_3)$alkoxy, $(C_1$-$C_3)$haloalkoxy or CN;
A is CH_2, O or a direct bond; and wherein the stereochemical configuration at the marked 1 position is as defined in formula (I),
with the exception of compounds of formula (V), or salts thereof, where:

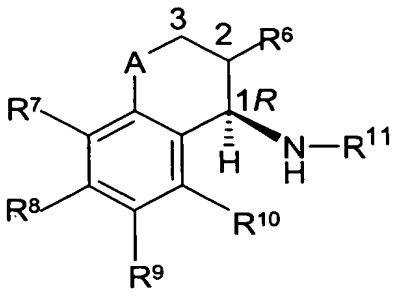
(i) A is a direct bond, R^6, R^7, R^8 and R^9 are each hydrogen, and R^{10} is hydrogen, methoxy, n-propoxy or cyano; or

(ii) A is CH_2, and R^6, R^7, R^8 and R^{10} are each hydrogen, and R^9 is hydrogen, methyl, methoxy, isopropoxy or t-butyl; or
A is CH_2, and R^6, R^7 and R^9 are each hydrogen, and R^8 is methyl and R^{10} is methyl; or

(iii) A is an oxygen atom, and R^6, R^7, R^8, R^9 and R^{10} are each H.

9. A compound of formula (III) or a salt thereof, as defined in claim 4.

10. A compound of formula (XIII) or a salt thereof,



(XIII)

in which

R^6 is H, $(C_1$-$C_6)$alkyl or $(C_1$-$C_6)$alkoxy; and R^7, R^8, R^9 and R^{10} are each independently H, $(C_1$-$C_4)$alkyl, $(C_1$-$C_3)$haloalkyl, halogen, $(C_1$-$C_3)$alkoxy, $(C_1$-$C_3)$haloalkoxy or CN; R^{11} $(C_1$-$C_6)$alkanoyl which is unsubstituted or substituted by one or more radicals selected from the group consisting of halogen, $(C_1$-$C_4)$alkoxy and $(C_1$-$C_4)$alkylthio; A is CH_2, O or a direct bond; and wherein the stereochemical configuration at the marked 1 position is (*R*) having a stereochemical purity of from 60 to 100 % (*R*), with the exception of compounds of formula (XIII), or salts thereof, where:

(i) A is a direct bond, R^6, R^7, R^8, R^9 and R^{10} are each hydrogen, and $R^{11}$is formyl, acetyl, trifluoroacetyl or bromoacetyl, or

A is a direct bond, R^6 is methyl; R^7, R^8, R^9 and R^{10} are each hydrogen, and R^{11} is acetyl, or

A is a direct bond, R^6; R^7, R^9 and R^{10} are each hydrogen, R^8 is fluoro, and R^{11} is acetyl, or

(ii) A is CH_2, and R^6, R^7, R^8, R^9 and R^{10} are each hydrogen, and R^{11} is acetyl, trifluoroacetyl or chloroacetyl; or

A is CH_2, and R^6, R^7 and R^9 are each hydrogen, and R^8 is methyl and R^{10} is methyl; and R^{11} is acetyl, or

A is CH_2, and R^6, R^7, R^9 and R^{10} are each hydrogen, and R^8 is methoxy, and R^{11} is acetyl, or

A is CH_2, and R^6 is methyl, R^7, R^8, R^9 and R^{10} are each hydrogen, and R^{11} is acetyl, or

(iii) A is an oxygen atom, and R^6, R^7, R^8, R^9 and R^{10} are each H, and R^{11} is acetyl.